

U.S. Patent Application Serial No. 10/084,367
Amendment Under 37 C.F.R. §1.111 dated August 22, 2003
Reply to Office Action of May 22, 2003

REMARKS

Claims 1 - 24 are pending in this application, of which claims 1-9 and 13 - 24 have been withdrawn from consideration. By this Amendment, claims 10, 13 and 17 have been amended and new claims 25 - 28 have been added. The applicant respectfully submits that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated May 22, 2003.

Election:

The Election of Species Action of January 31, 2003 recited species 4, the embodiment of Figs. 5A to 5H, claims 10 - 13. However, the Examiner who previously classified claim 13 in species 4, and now deletes claim 13 from species 4 without any explanation. It is submitted that the embodiment of Figs. 5A-5H forms a shallow and gentle profile diffusion region and a shallow and steep profile diffusion region for a short-channel transistor. As such, it is submitted that claims 1 - 17 and 25 - 28 read on the elected species for examination on the merits in this application.

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As to the Merits

As to the merits of this case, the Examiner sets forth the following rejections:

1) claims 10 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US 5,610,088) in view of Kapoor (US 5,78,350) and Wolf (Silicon Processing for the VLSI Era: Vol. 2 - Process Integration); and

2) claim 12 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. in view of Kapoor and Wolf as applied to claim 10 above, and further in view of Shibata (US 4,622,735).

These rejections are respectfully traversed.

Chang et al. first forms side wall spacers, implants impurities for forming source/drain regions, then removes side wall spacers, and implants impurities for forming lightly doped drain (LDD) regions. Similar processes are repeated to form CMOS structure.

Wolf implants n-type impurities for forming n-type wells and preforms activation thereafter.

Kapoor forms side wall spacers, then implants impurities and performs thermal process for forming source/drain regions, removes side wall spacers, and implants impurities and performs thermal process for forming LDD regions.

Shibata teaches laser annealing for activating source/drain regions, as taught by Change et al. and Kapoor.

Claim 10 defines (c) implanting impurities of a second conductivity type into a surface layer of the second region, and thereafter executing a first activation process to form a first impurity diffusion region, and (g) by using the first gate electrode as a mask, implanting impurities of a second conductivity type into a surface layer in said first region, and thereafter executing a third activation process to form a third impurity diffusion region wherein . . . the gradient of an impurity concentration distribution in a p-n junction formed by the third impurity diffusion region becomes steeper than the gradient of an impurity concentration distribution in a p-n junction formed by said first impurity diffusion region formed by said first activation process.

The first and third impurity diffusion regions are of the same second conductivity type formed in respective surface layers of the second and first region of the first conductivity type, but are formed separately to realize a steep gradient of an impurity concentration distribution in the first region, and a gentle gradient of an impurity concentration in the second region. The third impurity

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diffusion region can form a shallow extension (LDD) region for a short-channel high speed MOS transistor, while the first impurity diffusion region of gentle impurity concentration gradient can form a resistor of low leak current. None of the cited references teaches nor suggests this feature. Those skilled in the art will not try to increase the number of manufacturing steps without reason. The Examiner should consider every recitation in the claim. Claim 10 reciting the above feature is not taught by any of the cited references and should be distinguished thereover. Claims 11 and 12 depend from claim 10 and should be patentable, similar to claim 10.

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



Thomas E. Brown
Attorney for Applicant
Reg. No. 44,450

TEB/kal
Atty. Docket No. 020200
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930

Customer Number
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